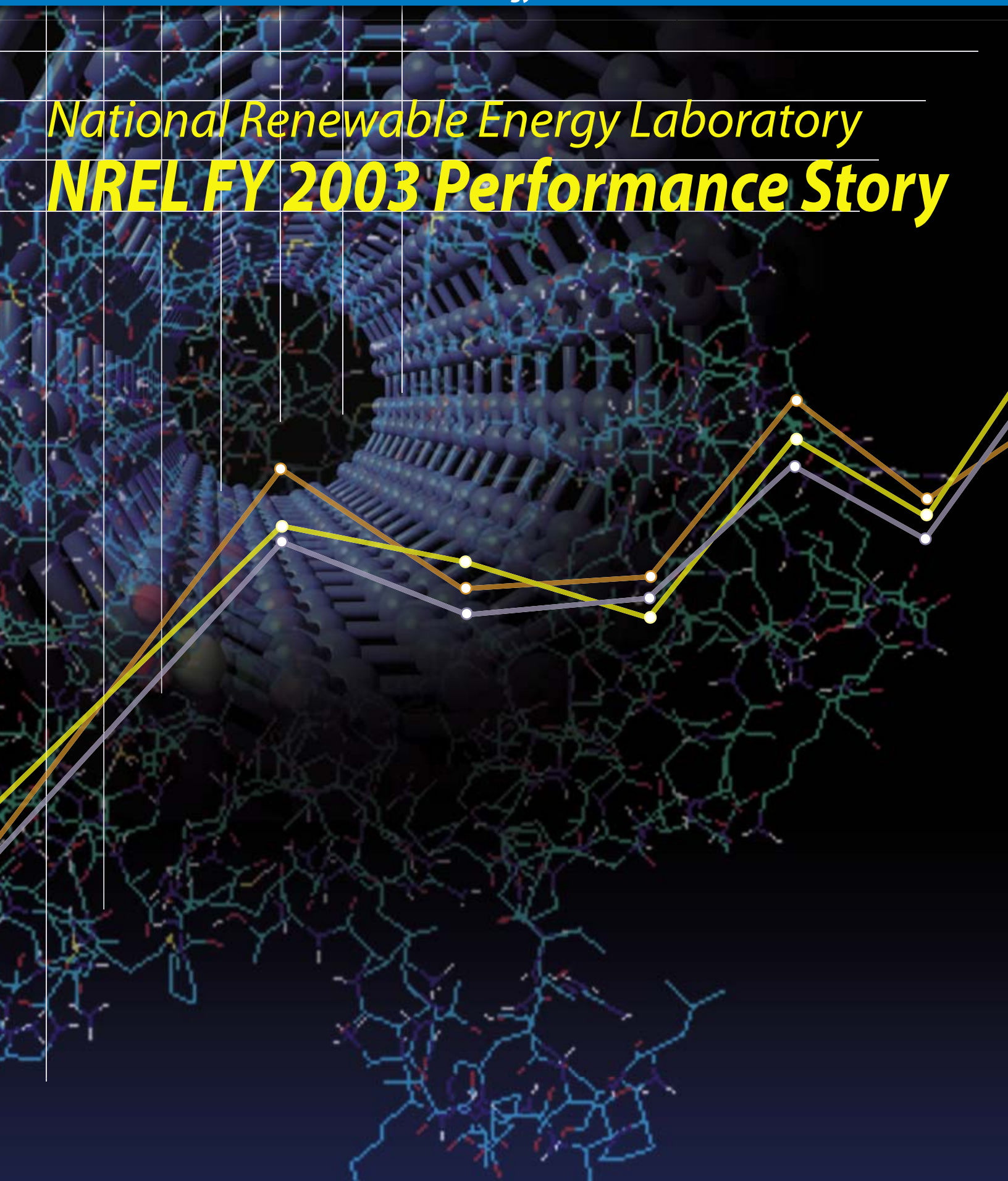
A national laboratory of the U.S. Department of Energy
Office of Energy Efficiency & Renewable Energy

NREL National Renewable Energy Laboratory

Innovation for Our Energy Future



National Renewable Energy Laboratory
NREL FY 2003 Performance Story

Message from the Director

"I am proud of these business and operations improvements. They play a significant role in enabling NREL to conduct world-class science and technology research more efficiently, maximizing research and development output per dollar invested at the Laboratory."

The hallmarks of a great national laboratory are the relevance and impact of its scientific output and the effectiveness of its business management practices. At the U.S. Department of Energy's (DOE) National Renewable Energy Laboratory (NREL), effective delivery of operational and business services helps us fulfill our core mission to advance renewable energy and energy efficiency technologies from concept to application. NREL continues to improve its operational and business performance and enhance the work environment through aggressive use of performance-based management, continuous improvement, and work-process redesign. As a result, NREL and its customers are realizing the benefits of cost reductions, efficiency gains, and productivity improvements.

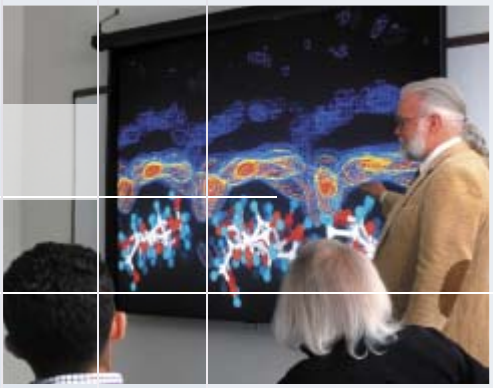
I am proud of these business and operations improvements. They play a significant role in enabling NREL to conduct world-class science and technology research more efficiently, maximizing research and development output per dollar invested at the Laboratory. Additionally, by integrating our core mission with how we conduct business, we are "walking the talk." We do this by incorporating sustainable practices into how we develop our sites; design and operate our facilities; purchase, use, and recycle materials and resources; and interface with our community. Careful measurement and monitoring of key indicators enables us to take actions consistent with our commitment to enhance our operational effectiveness, increase the efficiency of resource utilization, and reduce the environmental footprint of the Laboratory. We realize that the way we conduct our own operations and invest in our Laboratory is important to the future.

I hope you will take a few minutes to review this report to see how improved operations are helping to ensure NREL's success and support DOE and National Energy Policy objectives. I also invite you to visit our Web site at **www.nrel.gov** to learn about the diverse areas of renewable energy and energy efficiency research with which NREL is currently involved.

Richard Truly
Director, National Renewable Energy Laboratory
January 2004

Table of Contents

Foreword	*1*
NREL FY03 Budget Authorization	*2*
Laboratory-Level Business Management Outcomes	*3*
Financial Systems Management	*4*
Contracts and Procurement	*5*
Human Resource Management	*7*
Information Services Management	*9*
Sustainable NREL	*11*
Site and Facilities Management	*13*
Environment, Safety, and Health	*15*
Technology Transfer	*17*
Educational Science and Engineering Outreach	*19*



Foreword

The National Renewable Energy Laboratory, under the stewardship of the integrated Midwest Research Institute and Battelle team, is the U.S. Department of Energy's premier laboratory for renewable energy research and development and a leading laboratory for energy efficiency research. As such, NREL is a world leader in the development of these technologies, benefiting national priorities, the economy, and environment.

As a Federally Funded Research and Development Center (FFRDC), NREL is a partner with, and strategic advisor to, DOE. Lab staff assist DOE with a full range of energy-related activities beginning with analysis and planning, through research and development, and finally to technology demonstration and transferring NREL knowledge and technology to others. Commensurate with its FFRDC responsibilities, NREL provides leadership by integrating the science and technology expertise and viewpoints of industry, academia, and DOE through numerous collaborative activities. These collaborative activities include technology roadmapping, scenario planning, technology forums, and strategic planning, as well as a variety of peer, industry, and stakeholder reviews. To deliver on the Office of Energy Efficiency & Renewable Energy's (EERE) mission and leverage DOE dollars, NREL also uses a broad range of partnership mechanisms, including competitive contracting, Cooperative Research and Development Agreements (CRADAs), as well as other technology partnership agreements.

NREL's innovation has been consistently recognized by external entities, including the industry's top publications and technical journals, such as *R&D Magazine, Science, Journal of the American Chemical Society, Journal of Applied Physics, Architecture,* and *Technology Review*, as well as several prestigious institutions such as the Federal Laboratory Consortium for Excellence in Technology Transfer and the American Solar Energy Society. The complete list of awards that NREL and its researchers have won can be viewed by visiting **http://www.nrel.gov/awards**. Such recognition highlights the positive contribution the Lab has made to the development of clean and efficient energy technologies.

Alignment of NREL's Mission with DOE and EERE's

DOE

The Department of Energy's overarching mission is to advance the national, economic, and energy security of the United States; to promote scientific and technological innovation in support of that mission; and to ensure the environmental cleanup of the national nuclear weapons complex.

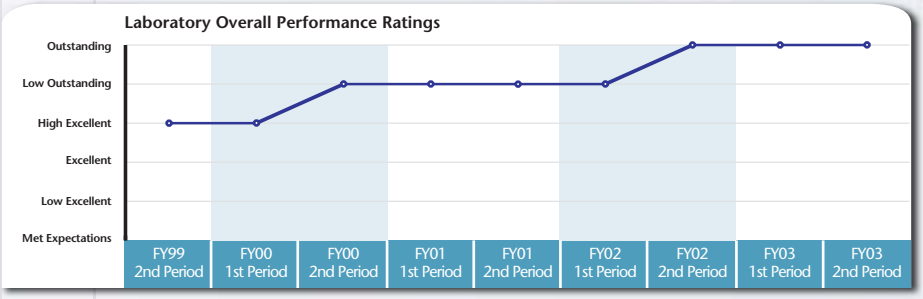
EERE

The EERE mission is to strengthen America's energy security, environmental quality, and economic vitality in public-private partnerships that: enhance energy efficiency and productivity; bring clean, reliable, and affordable energy technologies to the marketplace; and make a difference in the everyday lives of Americans by enhancing their energy choices and their quality of life.

NREL

NREL's mission is to develop renewable energy and energy efficiency technologies and practices, advance related science and engineering, and transfer knowledge and innovations to address the nation's energy and environmental goals.

A critical enabler of NREL's mission is strong and adaptable business and operational management. In this vein, NREL continues to be a best value provider to DOE, delivering exemplary business management and operational infrastructure support that is efficient, effective, and responsive to internal and external customer needs, thereby maximizing R&D output per dollar invested at the Laboratory. This report profiles NREL as one of DOE's national laboratories, emphasizing the management, delivery, and continuous improvement of business and operational support products and services that enable mission success. NREL's research highlights are chronicled in the Research Review, available by visiting **http://www.nrel.gov/research_review/.**



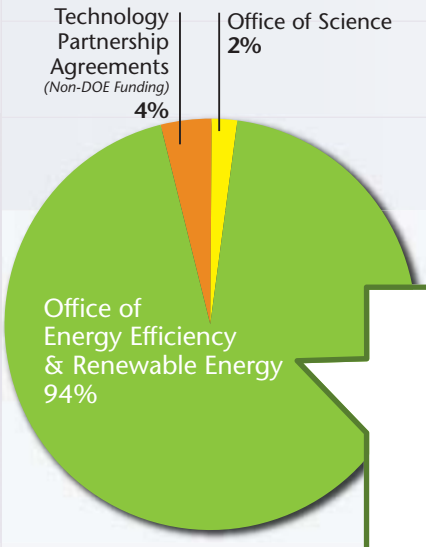
Effective Laboratory management and a commitment to continuous improvement create a work environment in which NREL staff can excel while contributing to the Lab's long-term, strategic goals. Through effective performance measurement and management, the Lab continues to drive an exceptional level of performance. As a result, NREL received an overall evaluation of 'Outstanding,' the highest rating possible, for the last three performance periods.

NREL FY03 Budget Authorization

NREL advances energy efficiency and renewable energy technologies from concept to commercial application in support of DOE's mission. NREL's work spans from basic science, through technology development and validation, to ultimately transferring knowledge and innovations to others.

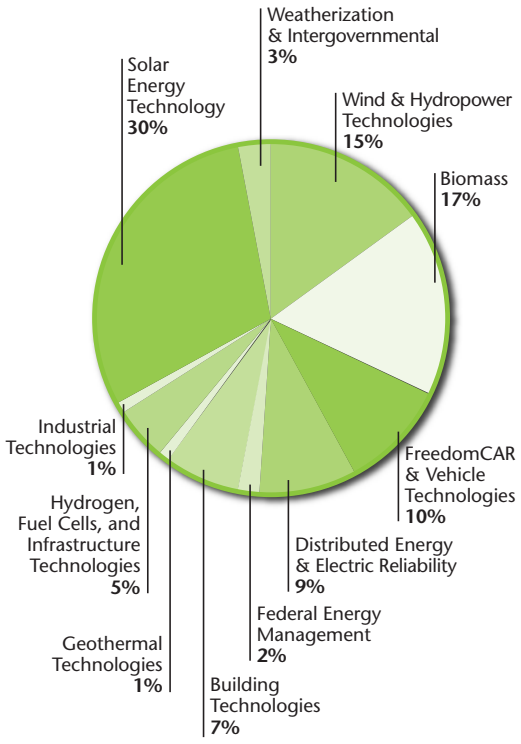
NREL's mission and activities are intimately linked with those of the Department of Energy's Office of Energy Efficiency & Renewable Energy. EERE has stewardship for NREL and oversight of the majority of the Laboratory's program portfolio. In partnership with EERE, NREL is developing and transferring the scientific knowledge and technology that enables a sustainable energy future. NREL's efforts cover nearly 50 areas of scientific and technical investigation, advancing the goals of the 11 EERE programs. In FY03, 94% of NREL's total funding was from EERE.

In addition to EERE, NREL conducts basic research in support of the Office of Science in key areas that underpin the Laboratory's mission. With the proviso that the work NREL performs is consistent with its mission, the Lab works with, and for, a wide range of groups outside DOE, including industry, universities, state and local governments, other federal agencies, and domestic and international non-government organizations.



Total FY03 Funded Activities

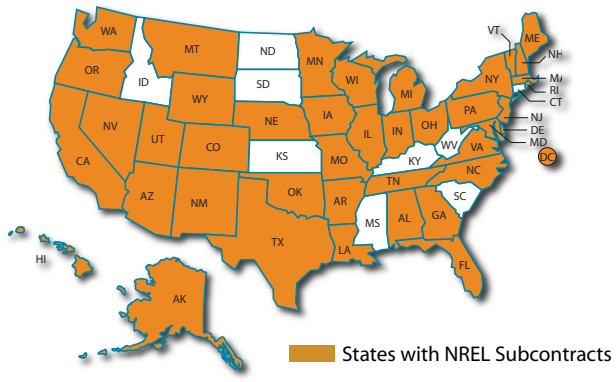
Consistent with historical trends, 96% of NREL work in FY03 was performed in support of DOE's Office of Energy Efficiency and Renewable Energy and the Office of Science. Non-DOE sources provided an additional 4% of NREL's funding.

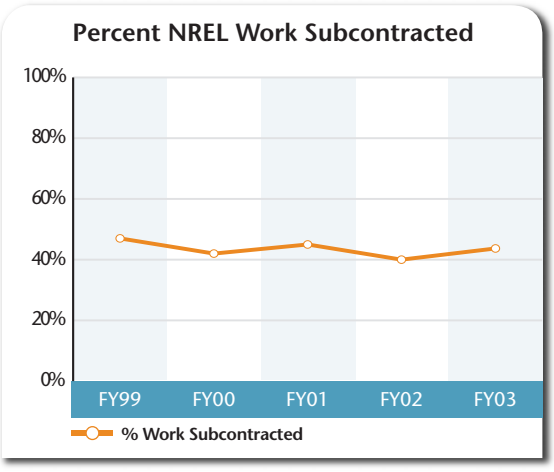


FY03 Funding from EERE

NREL's work spans a variety of sectors and a wide array of energy sources and types, which positively impacts a broad range of energy issues. Actual FY03 funds received from EERE equaled $204 million.

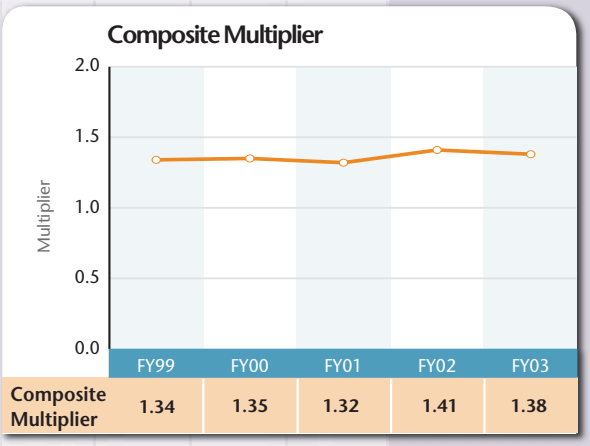
In accomplishing the EERE mission, NREL subcontracts approximately 45% of its work to outside entities. In FY03, subcontractors in 43 states helped the Laboratory further this mission.





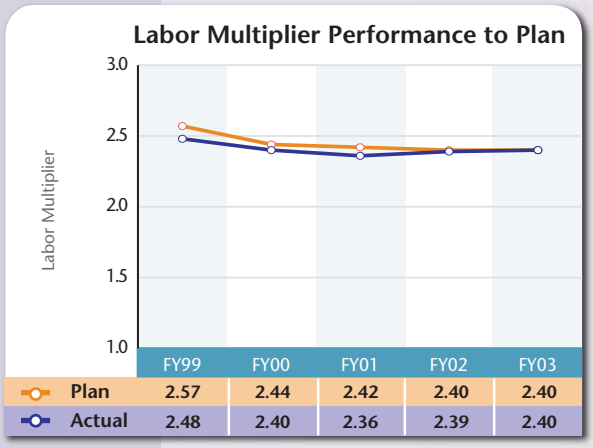
Laboratory-Level Business Management Outcomes

NREL manages its performance using key Laboratory-level indicators. The following charts demonstrate the outcomes of effective management, emphasizing results and improvements. Measurement of the Laboratory's composite multiplier and labor multiplier were chosen as indicators because they remove inflation as a factor, and provide a means for consistently monitoring performance over time.



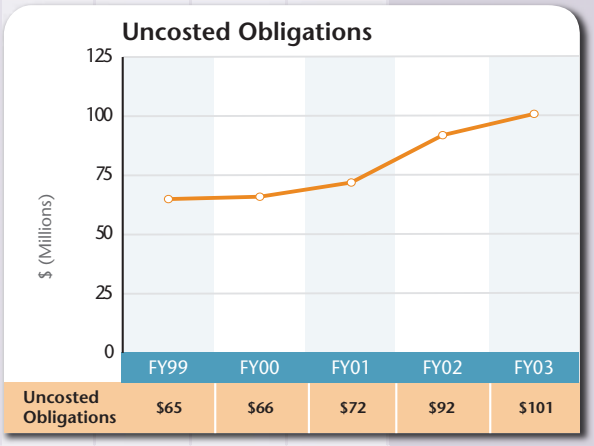
	FY99	FY00	FY01	FY02	FY03
Composite Multiplier	1.34	1.35	1.32	1.41	1.38

NREL monitors the overall ratio of total support costs to Lab in-house and subcontracted efforts. Careful management of this ratio between direct and indirect costs allows NREL to remain a low-cost provider within the DOE laboratory system.



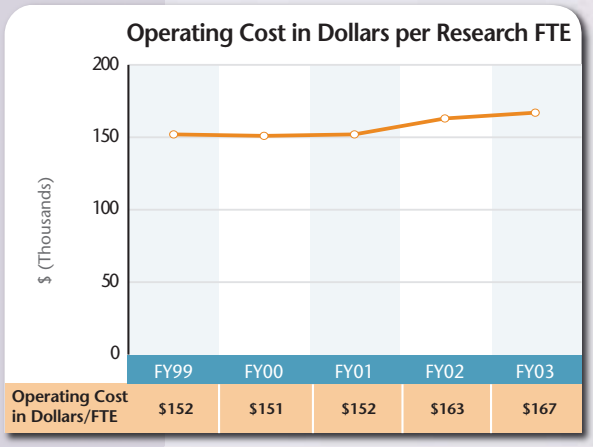
	FY99	FY00	FY01	FY02	FY03
Plan	2.57	2.44	2.42	2.40	2.40
Actual	2.48	2.40	2.36	2.39	2.40

NREL maintained its target labor multiplier of 2.40 in FY03. Proactive management and timely response to changing requirements and priorities enabled the Lab to meet its goal while absorbing significant increases in pension costs.



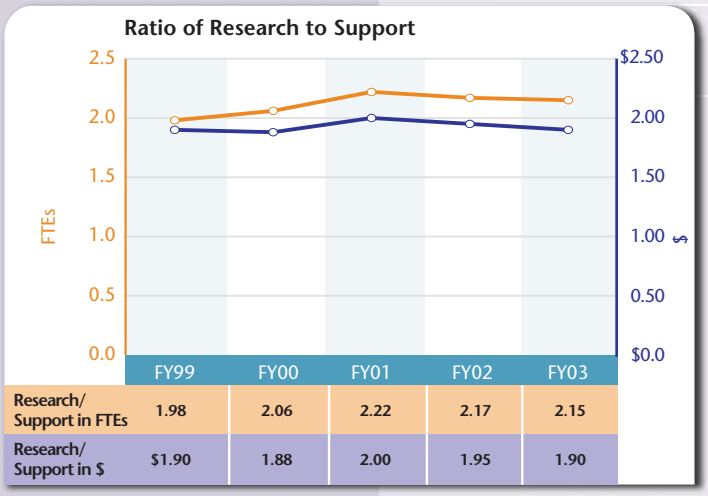
	FY99	FY00	FY01	FY02	FY03
Uncosted Obligations	$65	$66	$72	$92	$101

NREL achieved an optimal level of uncosted Goods and Services on Order (GSO) balance from FY99-FY01. In FY02 and FY03, delayed receipt of funding due to continuing resolutions required the Laboratory to delay placing the subcontracts, which resulted in a higher ending GSO. While the level of uncosted obligations has increased, prior commitments and work are associated with this ending uncosted balance.



	FY99	FY00	FY01	FY02	FY03
Operating Cost in Dollars/FTE	$152	$151	$152	$163	$167

Operating cost per research Full-Time Equivalent (FTE) is a measure of cost effectiveness and overall operating efficiency. Operating costs include labor, facilities overhead, recharge costs, and other indirect costs. The FY02 and FY03 increase is a result of strategic investments made to build NREL's computational science capabilities and enhance the Lab's electronic processing capabilities. This chart is not adjusted for inflation.



The ratio of research (direct) to support (indirect) FTEs indicates that more NREL staff is working directly on the science and technology needs of the Laboratory's clients, relative to those providing the support products and services required to conduct NREL's mission work. Approximately two of every three dollars invested at NREL are spent directly on producing research, development, field verification and testing, technical analysis, and technical assistance outcomes and results.

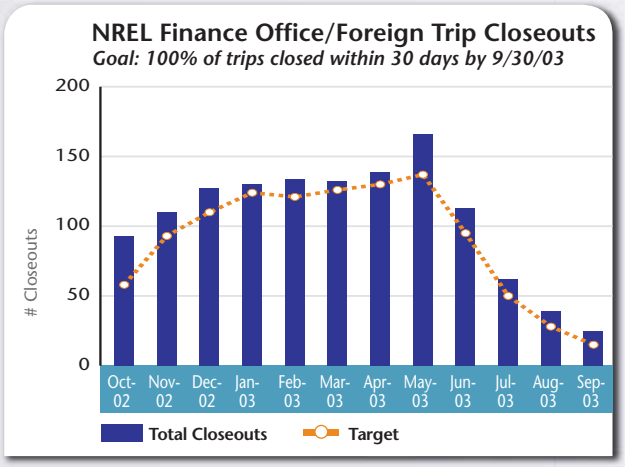
Financial Systems Management

Integrated funding, budgeting, and accounting systems are one of the core elements of Laboratory operations. Effective management of these systems enables the smooth operation of the Laboratory through difficult challenges, including the late receipt of FY03 funding and increased pension costs.

Strong management, in conjunction with collaborative efforts across NREL in partnership with DOE-GO, resulted in timely closeout of all FY98 Limited Term Appropriations funding that expired at the end of FY03. Planning for this new process began two years ago to ensure the effective use of funding, with completion of planned program work, required audits, final vendor payments, and timely closeout with return of unused funds. This new process will also support closeout of Limited Term Appropriations expiring at the end of FY04 and FY05.

Processes were further streamlined with the full implementation of two Make/Buy recommendations. Work hour efficiency (productive/rechargeable work compared to total hours worked) increased dramatically after outsourcing the Subcontract Audit function in December 2002. The FY03 recharge efficiency averaged 90% in the last three quarters of FY03, compared to an FY02 average annual efficiency rate of 67%.

Similar gains were realized with the new approach to document scanning that allows efficient Web-based document retrieval with information now available weekly. In addition to the improved efficiency, NREL exceeded the FY03 closeout goal by $14 million.



In early FY03, NREL recognized certain inadequacies in the closeout of foreign trips and took steps to improve the process, which enabled timely receipt of final expense reports and an overall reduction in backlog.

The Lab also completed the planning and testing of systems required to meet earlier reporting deadlines in support of DOE's new accelerated financial reporting, which cut two days off month-end closing schedules. This effort supports DOE's need to provide timely financial statements to Congress and the Office of Management and Budget.

Re-engineering of the foreign trip closeout process significantly improved NREL's timeliness in meeting requirements of the DOE Foreign Travel Order. As a result, delinquent foreign trip closeouts in the DOE foreign travel system decreased dramatically in FY03.

Contracts and Procurement

With approximately half of NREL's work being awarded to subcontractors, timely awards are critical. Advanced procurement planning played an important role in mitigating the impacts of delayed funding, ensuring that subcontracts were ready to place as soon as full funding was received. NREL's FY03 subcontract goal of $108 million was exceeded by 10%.

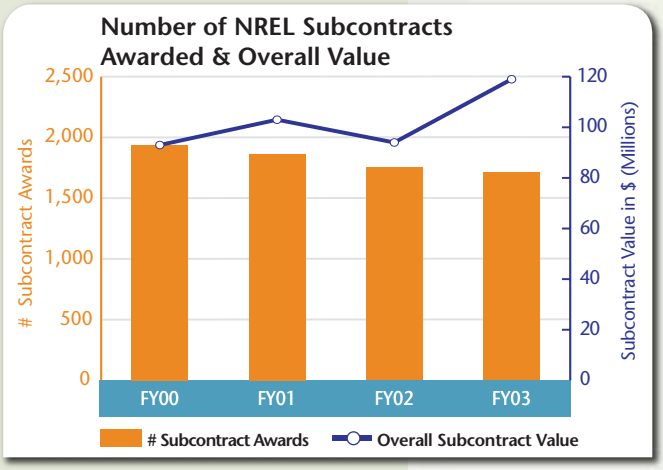
In FY03, the dollar value of awards increased while the number of awards decreased, indicating a higher dollar value per award. At the same time, socio-economic competitive targets were maintained.

Cost-shared subcontracts continue to provide increased leveraging of DOE R&D funding and comprise a significant component of the NREL subcontract portfolio. Such cost-shared subcontracts also indicate that NREL's industrial partners recognize the value of these R&D efforts.

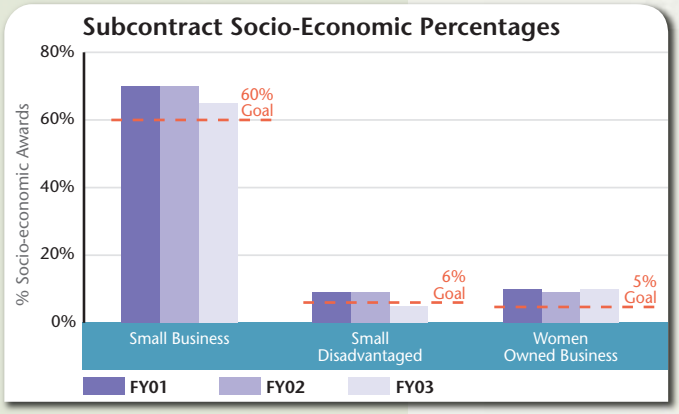
In FY03, subcontract administrators were able to dramatically improve their individual productivity through the implementation of a co-located Cost/Price Analysis and Subcontract Audit function. Average actions per FTE increased by 18% and subcontract dollars increased 55% from FY02.

NREL's Purchase Card Program (P-Card), assessed in FY02, continued to undergo enhancements in order to meet or exceed revised DOE HQ expectations and to define more clearly the requirements for P-Card holders and staff responsible for oversight of P-Card transactions. Efficient management of NREL's P-Card program has allowed the total FTEs assigned to P-Card transactions to remain constant at 0.5. DOE recognized NREL's program as noteworthy and asked the Laboratory to be a key member of DOE's process improvement team.

NREL fully implemented the use of software, enhancing the Laboratory's ability to effectively monitor P-Card transactions. The effectiveness of this tool, designed to flag transactions for potential fraud and abuse, was reflected by the findings of an internal audit of the program, which found no significant deficiencies or indicators of fraud and abuse.



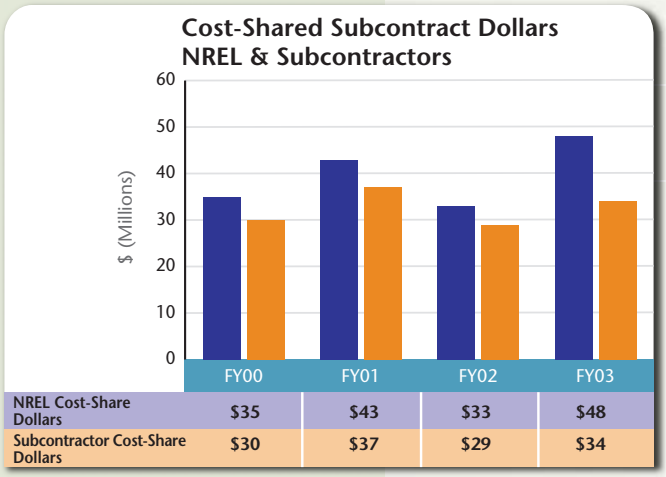
While the number of awards slightly decreased, the overall dollar value increased significantly in FY03.



Socio-economic awards to small, small-disadvantaged, and women-owned businesses remain at a significantly high percentage, 64.8%, of total subcontract awards.

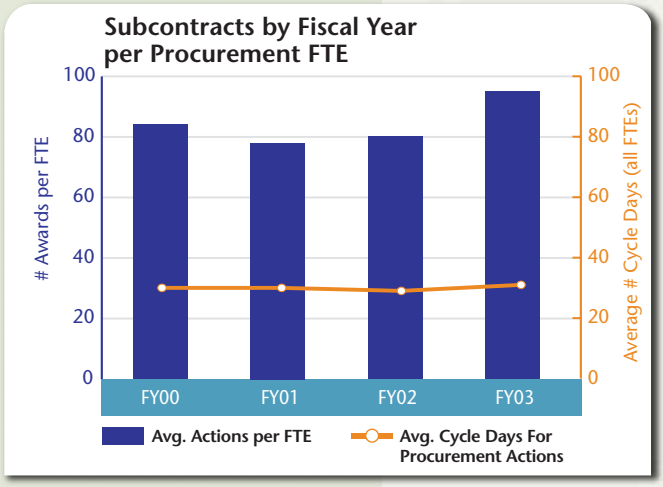
Competitive awards are based on "best value" (evaluated qualitative merit and evaluated cost or price); noncompetitive awards are actions negotiated with a single source. The FY03 percentage of 81% competitive is very favorable performance for a Laboratory doing complex scientific and engineering tasks. FY03 goals were 70% for competitive awards (dollars).

Contracts and Procurement

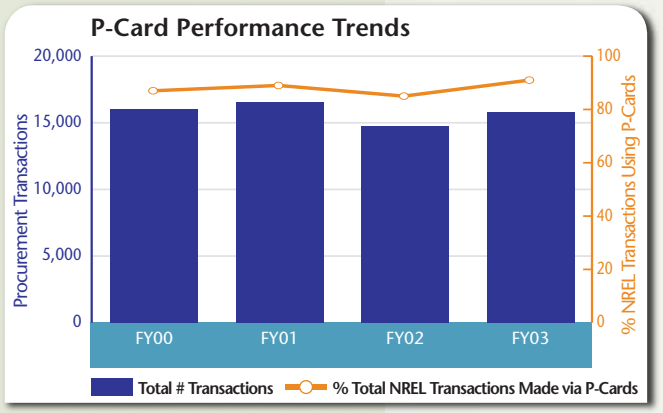


	FY00	FY01	FY02	FY03
NREL Cost-Share Dollars	$35	$43	$33	$48
Subcontractor Cost-Share Dollars	$30	$37	$29	$34

In FY03 NREL awarded $82 million in cost-share subcontracts in 260 actions (twice the number of actions from FY02). Of these awards, 59% were NREL cost-share dollars, and 41% were contractor cost-share dollars.



NREL effectively responded to increased workload with no increase in resources. With 95 average actions per FTE, the Lab surpassed its goal of 80 actions per FTE. In addition, the cycle time for subcontract awards remained stable.



NREL efficiently utilizes its P-Card system. In FY03, 91% of Laboratory procurements were made using this alternative method. This results in fewer purchases through the formal NREL Purchase Request system, thus enhancing NREL's cost-to-spend ratio.

Human Resource Management

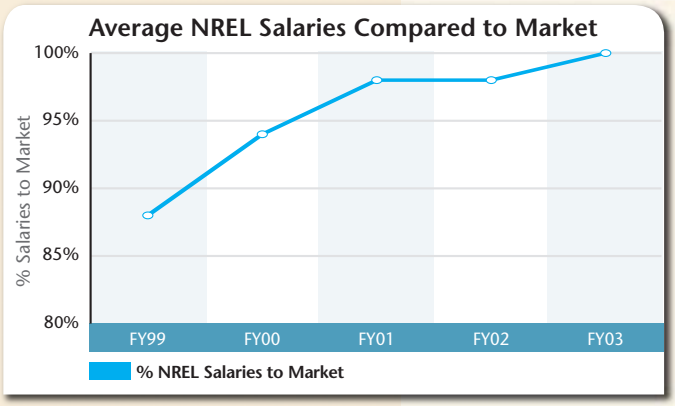
Institutional emphasis on a holistic approach to the management of human capital resulted in enhanced benefits without increased costs, improved performance management processes, and greater flexibility in how staff members accomplish their work.

The Lab's Life Insurance and Long-term Disability programs were significantly improved in FY03. Improvements implemented in FY03 included enhanced life insurance coverage at a lower cost to both the employee and NREL, and income protection for long-term disability for all regular employees.

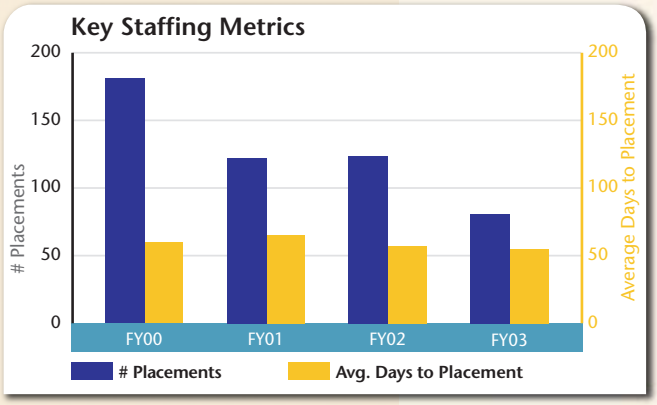
NREL completed an evaluation of personal time off options to develop a Personal Time Off (or Combined Leave) program. The goals of this program are to provide staff members greater flexibility in use of their time off options while maintaining a comprehensive and cost-effective benefits program. The final program was implemented in January 2004, and is expected to result in significant productivity gains.

Additionally, NREL met its goal of having average salaries at 100% of market, resulting in a more stable workforce and further productivity gains. Competitive pay and benefits, together with a meaningful performance management approach, are critical to attracting and retaining staff that will assure the Lab's viability well into the future.

NREL achieved efficiency gains in hiring as well. The Lab monitors the number of hires, the cycle time for bringing on new hires, and the average cost to placement to assure that once a position opens, it can be effectively and efficiently filled. FY03 results show a reduction in hires, which was expected due to the late receipt of funding and the Lab's low turnover rate. The average days-to-placement was slightly lower than previous results.



To attract and retain high-quality technical and support personnel required to execute its mission, it is critical that NREL salaries be at – or near – market as a key element of total compensation. NREL continued to improve in market comparability, a key component of a stable and effective workforce.



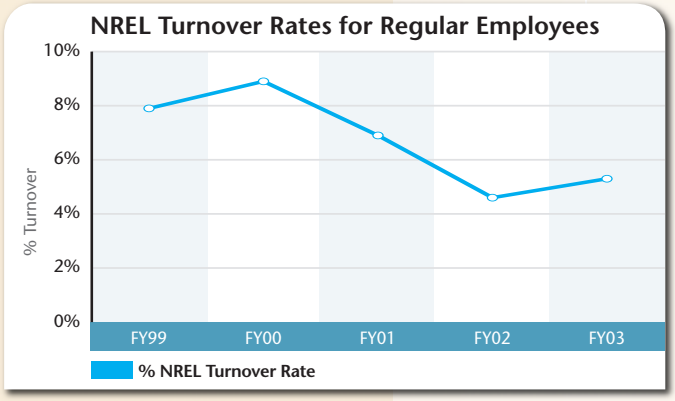
The types of positions filled in FY03 were mostly strategic hires that were senior and experienced in fields with very limited availability. Employment markets for these senior staff are more competitive, requiring greater effort in terms of cost and time for a successful hire.

Human Resource Management

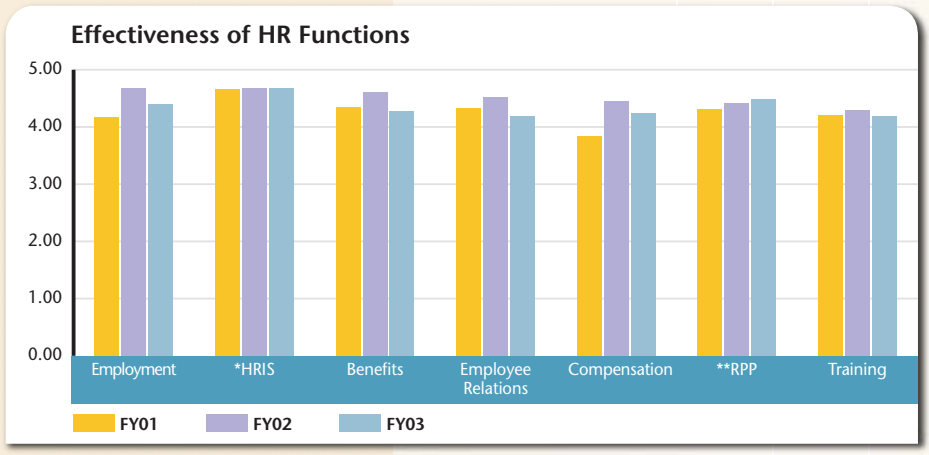
One of the Lab's goals is to be recognized as a diversity leader among its employees, the stakeholder community, and the U.S. Department of Energy. In its ongoing commitment to become a diversity leader, NREL has developed a Diversity Program that promotes excellence by recruiting, developing, training, and retaining a qualified, diverse workforce to reach the goals of its mission.

NREL is able to attract, hire, and ultimately retain world-class capabilities, thanks to its focus on staff, along with the Lab's compelling mission. Of NREL's staff turnover in FY03, less than 1% included management, and less than 4% included engineers or senior scientists.

Maintaining low staff turnover is important to the Laboratory for numerous reasons. Keeping turnover low requires being aware of the current state of the work environment. NREL's Human Resource Survey monitors the effectiveness of key HR functions and indicates that the Lab continues to maintain a high level of employee satisfaction.



NREL's staff turnover rates for regular employees reflect the Laboratory's success in retaining its valuable staff.



Responses from the third annual Human Resources electronic survey measure key HR areas such as accuracy, timeliness, customer service, and quality of information. (A 5 rating indicates the most favorable response to the questions, 0 indicates the least favorable responses.)

* *HRIS=Human Resource Information System*

** *RPP=Research Participant Program*

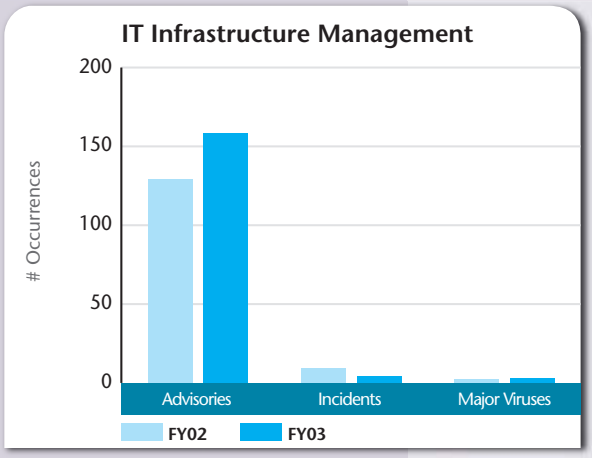
Information Services Management

A key enabler of NREL's mission is effective management of the Laboratory's information technology. In FY03, NREL's IT infrastructure was managed to ensure network service availability at or above NREL's target of 99.7%.

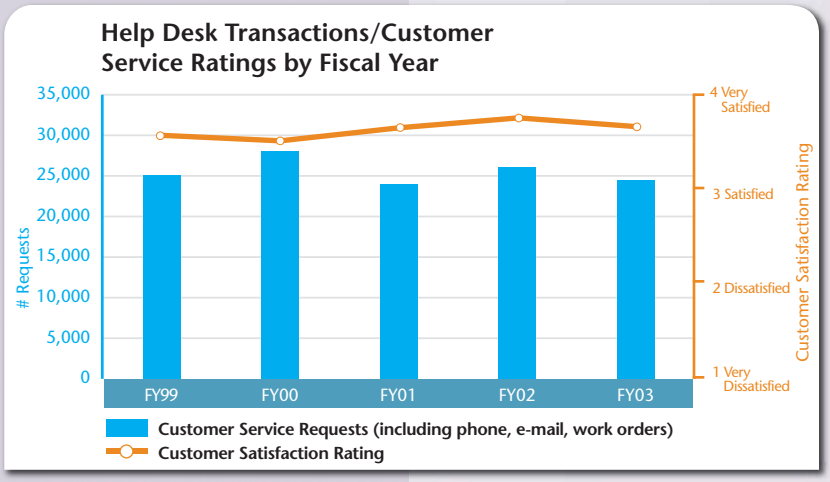
NREL's virus protection strategy, along with good Laboratory practices demonstrated by many NREL employees, has helped minimize the impact of major threats. At the same time, the Laboratory quickly responded to increasing cyber-related requests and DOE notices sent for review. Most importantly, zero downtime was reported due to cyber incidents.

A voluntary computer power management program was initiated in FY03. This Laboratory-wide management system was aggressively implemented and included completion of NREL's baseline energy use.

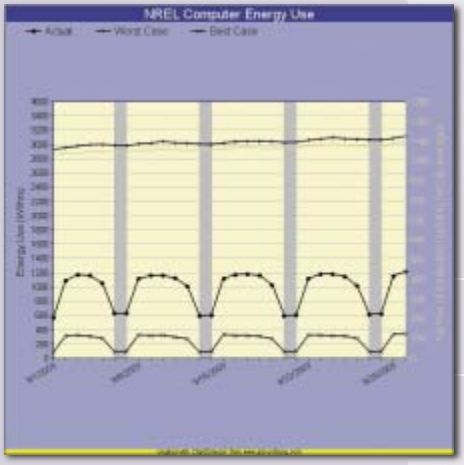
An important component of the Laboratory's IT infrastructure is its library services, which enable effective dissemination of NREL research and provide internal access to outside research. Effective management of NREL's desktop resources has facilitated an average of 82 literature searches and an average of 299 electronic journal uses for every science and technology staff member. Metrics such as these help provide a basis for assessing progress in the future.



NREL investigated more than 158 cyber security advisories (an increase from 129 in FY02), had only three localized virus infections, and three cyber security incidents with zero downtime due to incidents.

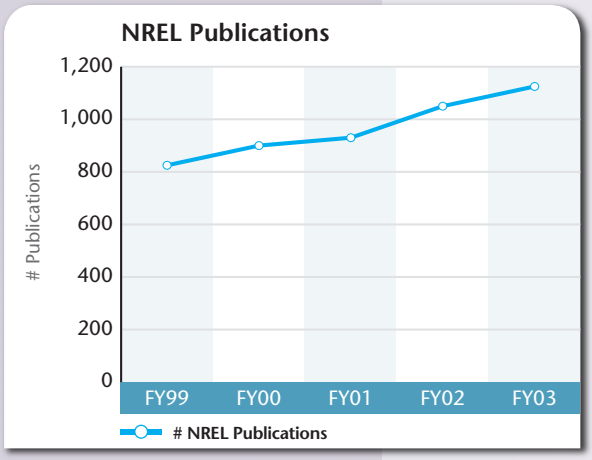


Client Services (which includes the help desk, technicians, training, and desktop integration) continues to effectively respond to demand.

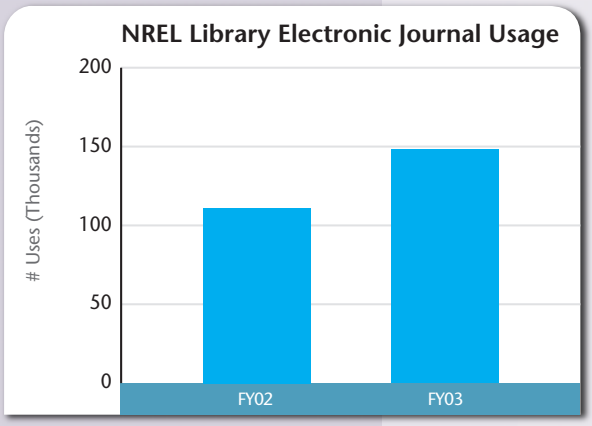


NREL continuously maintains records of computer power usage throughout the Laboratory. The "worst case" energy use would occur if all NREL computers were always on - 24/7. The "best case" reflects the lowest possible energy use that would occur if there were no idle times at all when the computers are on (not achievable).

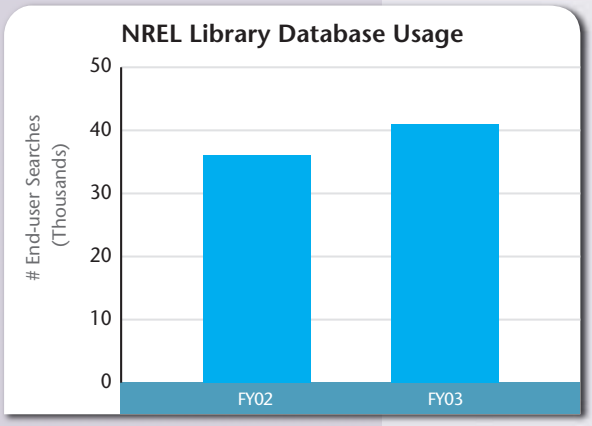
Information Services Management



NREL's Publication Database plays a key role in supporting the dissemination of important research and program information to the public. Since trending started in FY99, the total number of publications managed through the database has consistently increased.



Laboratory scientists' use of e-journals continues to increase. With a total 148,309 uses, FY03 results indicate a 26% increase in usage over FY02.



The number of end-user searches through NREL's library database continues to increase. The 41,167 searches in FY03 reflect an increase of 13% over those completed in FY02.

Sustainable NREL

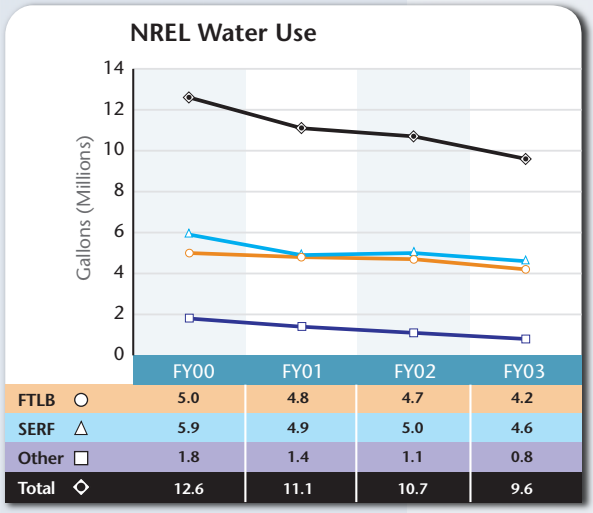
NREL continues to demonstrate its commitment to keeping the Laboratory at the forefront in applying sustainable technologies and practices in its operations. This commitment is a strong part of the culture at NREL. The Laboratory's over-riding philosophy is to use minimal resources (energy, materials, water, etc.) while receiving the maximum value from those resources used – along with balancing environmental, economic, and human impacts.

NREL "walks the talk" every day, and the Lab continued to demonstrate excellence in energy management with energy consumption consistently falling well below DOE goals. NREL was recognized for this achievement, receiving a 2003 Departmental Energy Management award.

Water conservation best management practices were implemented at 100% of NREL's DOE-owned facilities. Current and historic monthly energy- and water-use information for each NREL facility is now available to all management and staff. This information is the centerpiece of energy- and water-management activities and a staff education program. These efforts resulted in a 25% reduction in the Laboratory's water usage within the last three years.

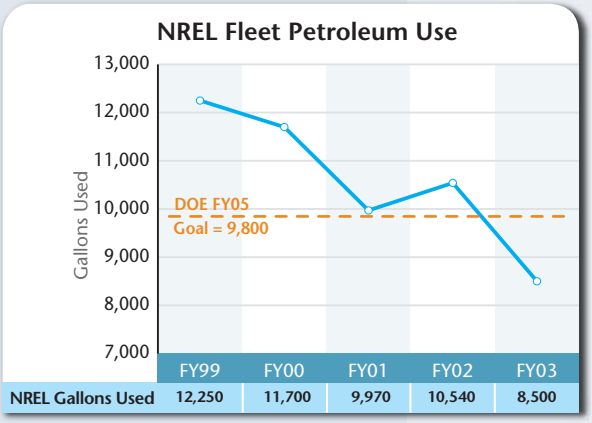
The Lab has also significantly decreased its petroleum use. With 75% of NREL's existing vehicle fleet alternatively fueled, the Laboratory has already exceeded the federal transportation FY05 goal of 9,800 gallons used per year.

These considerations were incorporated in NREL's recently completed 25-Year General Development Vision, which features sustainability as a focus. The long-term vision is to create a world-renowned high-performance research center that showcases energy technology innovation and leadership, and embraces the best in energy practices.



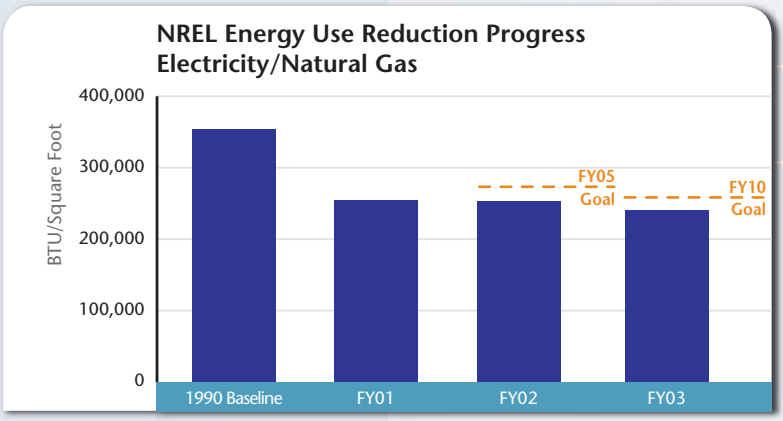
	FY00	FY01	FY02	FY03
FTLB ○	5.0	4.8	4.7	4.2
SERF △	5.9	4.9	5.0	4.6
Other □	1.8	1.4	1.1	0.8
Total ◇	12.6	11.1	10.7	9.6

Surpassing the 2004 federal water conservation requirement, the Laboratory has achieved a greater than 25% reduction in water usage from the FY00 baseline.



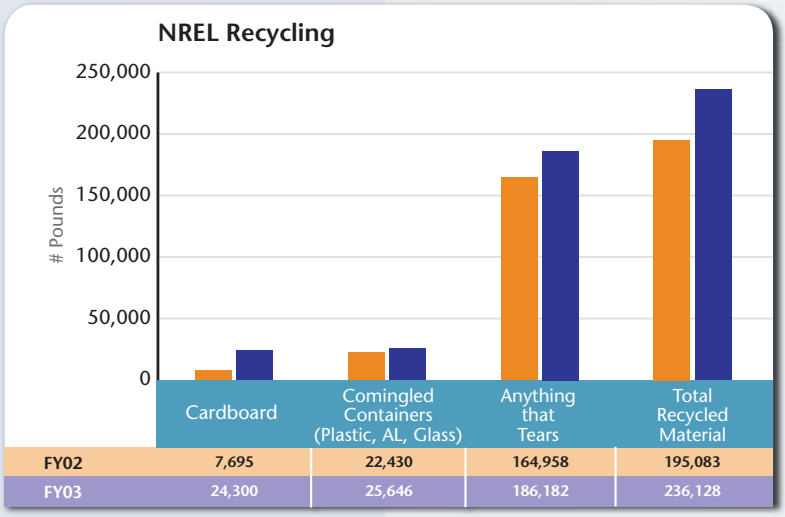
	FY99	FY00	FY01	FY02	FY03
NREL Gallons Used	12,250	11,700	9,970	10,540	8,500

In FY03 NREL achieved the Executive Order standard (EO13149) goal set for FY05; reducing fleet petroleum use to 9,800 gallons or less.



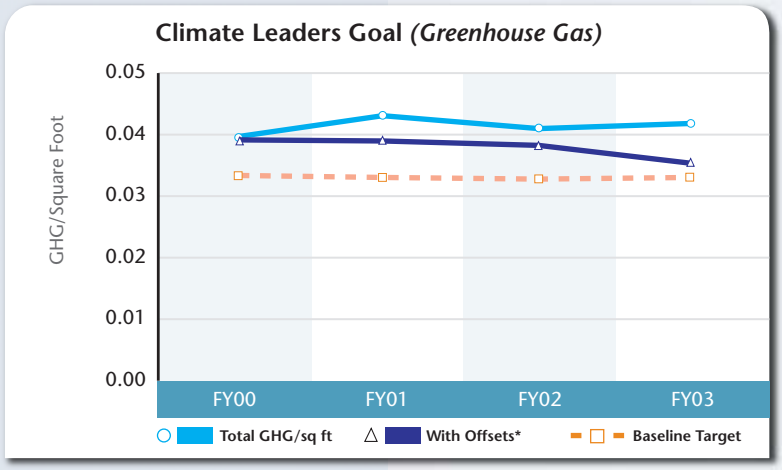
NREL first met DOE's FY05 and FY10 goals in FY01 and continues to reduce consumption of electricity and natural gas.

Note: NREL usage does not include Green Purchase exemption of 17,419 BTU/Square Foot per year.



	Cardboard	Comingled Containers (Plastic, AL, Glass)	Anything that Tears	Total Recycled Material
FY02	7,695	22,430	164,958	195,083
FY03	24,300	25,646	186,182	236,128

A formal Laboratory recycling program helped to improve NREL's recycling efforts by 18% in FY03.



Through the EPA Climate Leaders Program, NREL pledged to reduce its greenhouse gases by 10% before FY05. The Laboratory is on track to meet this voluntary commitment.

** Green Power purchase is equal to 10% of NREL's total electrical use.*

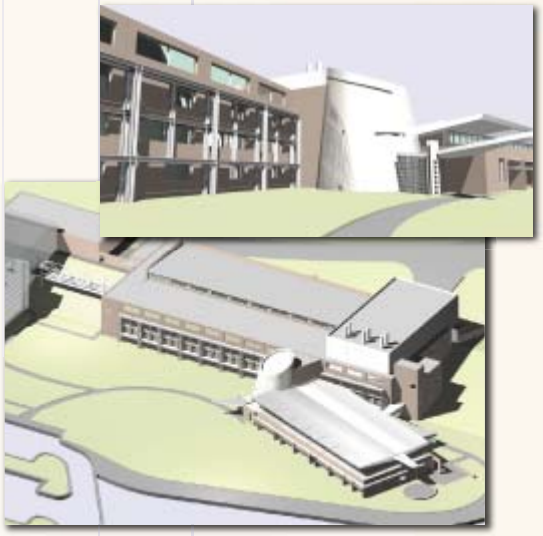
Site and Facilities Management

The Laboratory continued to provide exceptional stewardship and protection of DOE facilities, equipment assets, and investments. A key challenge is the limited availability of workspace.

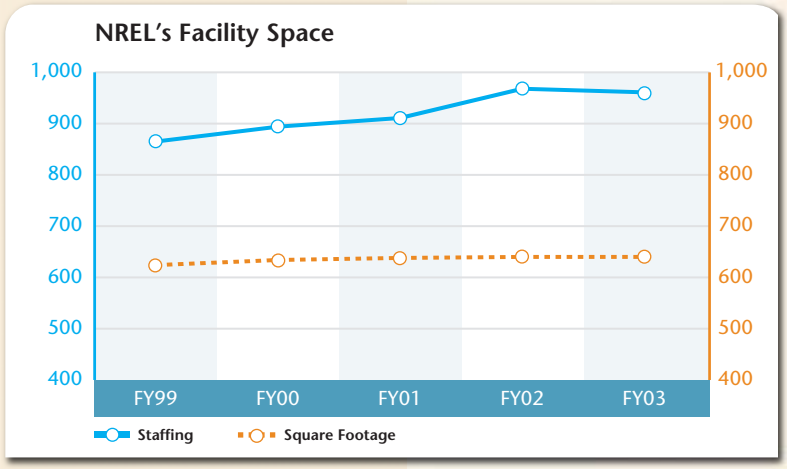
Through proactive management of facility space, the Laboratory effectively utilizes its workstation and laboratory space within existing constraints. Since FY00, NREL's overall facility square footage has increased only 2.6%, while employee headcount has increased 13%. Laboratory space utilization is at 99%, while workstation utilization is 94%.

To help alleviate some of these space constraints, NREL gained DOE approval to complete final design documents for the Science & Technology Facility (S&TF) – moving the facility closer to construction. Making the S&TF a reality is especially important considering the significant challenge that exists for NREL in the management of space.

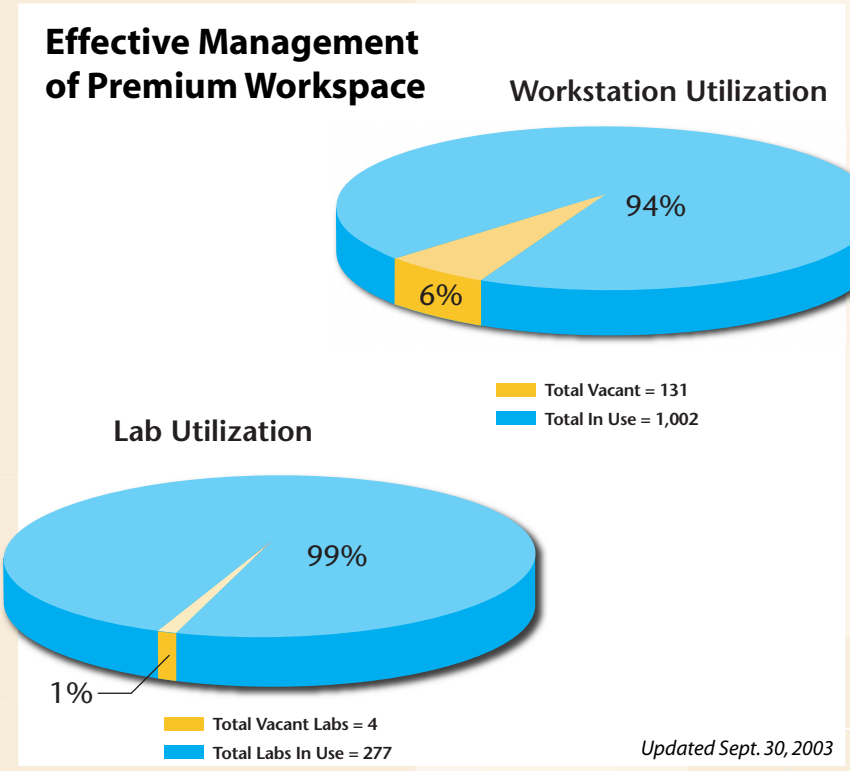
The S&TF will provide a first-of-its-kind capability to perform vitally needed process research on thin films and nanostructures for DOE and U.S. industry in developing energy technologies.



Artist rendition of the S&TF. The research facility was designed with utmost concern for the environmental impact of the building.



Increases in overall facility space have been minimal over the last five years with only 2.6% overall growth, while payrolled employee headcount has increased 13% since FY00. This results in a situation where workstation and laboratory space is at a premium.

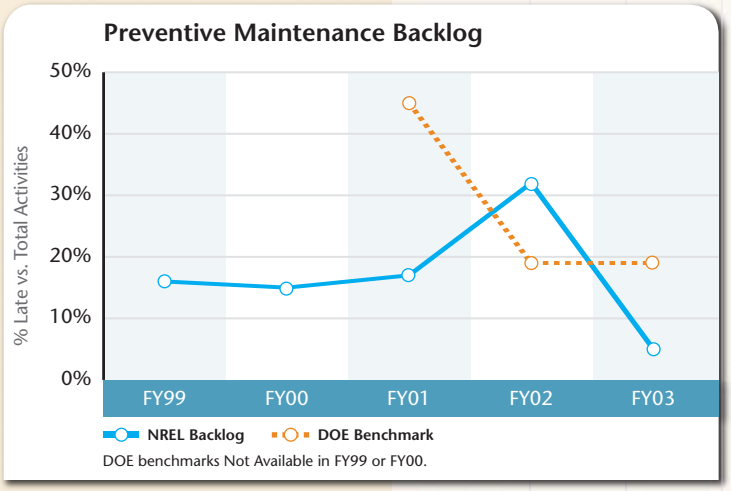


Site and Facilities Management

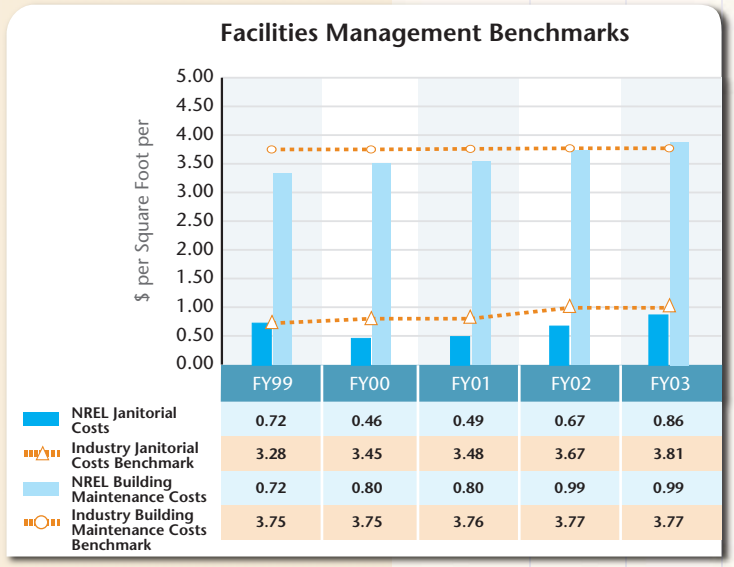
NREL's first zero energy building uses state-of-the-art equipment, which will result in energy savings of $50,000 per year.

NREL also saw new construction in FY03 when the Lab's first net zero energy building was constructed at the site entrance to the National Wind Technology Center. The energy efficient design features PV panels, a wind turbine, a trombe wall, and high R-Value insulation. No utility power service line is required – thereby producing energy savings of $50,000 per year.

To better assess the current state of Lab facilities, an objective third-party subcontractor completed a comprehensive facility condition assessment for all DOE-owned facilities. The quantitative results of the assessment validate the state of maintenance of the facilities is "good," with a Facilities Condition Index (FCI) of 2.2 on a 1- 6 scale, with 1 being optimal. This rating is one of the highest in the department. GPP and GPE funds were spent to both expand research capability and to upgrade and replace infrastructure; while operating funds were predominantly directed at ongoing facility maintenance. The FCI assessment confirms that NREL's balanced approach supports facility and capacity needs, and results in the protection and maintenance of DOE assets.



NREL re-evaluated the Preventive Maintenance processes in FY02, and made improvements that significantly enhanced its overall efficiencies.



	FY99	FY00	FY01	FY02	FY03
NREL Janitorial Costs	0.72	0.46	0.49	0.67	0.86
Industry Janitorial Costs Benchmark	3.28	3.45	3.48	3.67	3.81
NREL Building Maintenance Costs	0.72	0.80	0.80	0.99	0.99
Industry Building Maintenance Costs Benchmark	3.75	3.75	3.76	3.77	3.77

NREL continued to demonstrate stewardship through its day-to-day management of facility and site services. Janitorial and building maintenance costs continue to meet or exceed established industry benchmarks.

Environment, Safety, and Health

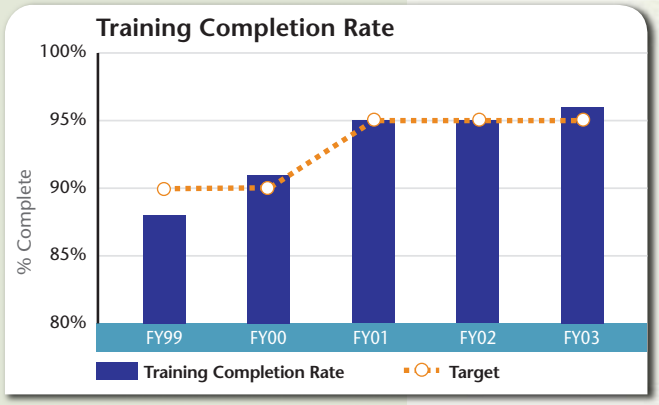
Mitigating environment, safety, and health concerns remains a priority for the Lab. NREL continues to implement risk assessment activities as a proactive management tool, resulting in effective control of hazards while reducing time and budget impacts.

The S&TF Hazard Analysis Report and Fire Hazard Analysis were developed in parallel with the facility design process. These coordinated analyses resulted in incorporation of cost-effective design elements that effectively respond to the fire threat presented by concentrations of high-valued research equipment.

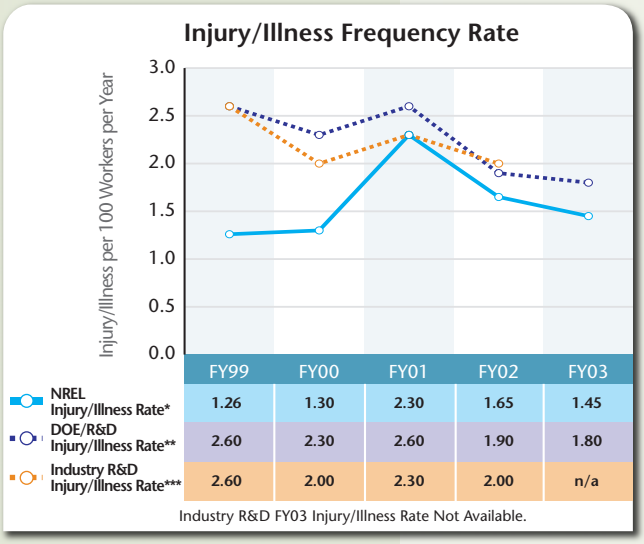
These performance successes and lessons learned, as well as others in the areas of sustainability, environmental management, and risk assessment, were communicated across the DOE complex via presentations at multiple DOE-sponsored workshops, direct involvement in quarterly briefings with EERE senior management, and use of the DOE Lessons Learned server. These efforts strongly support the best-management concept of communicating information to all audiences that might benefit.

NREL also enhanced its site-level environmental management capabilities through completion of the South Table Mountain Site-Wide Environmental Assessment (STM EA) with a Finding of No Significant Impact for site developments planned for the next five years. This EA was closely coordinated with the 25-Year General Development Vision, other planning and development documents, and the S&TF design, resulting in a strong set of site management tools for the STM site. Additionally, use of a team approach and other process refinements resulted in the STM EA being completed 22% under the original budget estimate while including traffic and vegetation studies not in the original project scope.

To sustain an appropriate level of support and respond to an increasing need in the environmental area, ES&H staffing levels increased 10% (one FTE). This senior environmental engineer has supported environmental assessments for off-site technology deployment projects, helped coordinate sustainability and environmental management activities, and implemented improvements to Laboratory-wide environmental programs.



Improvements to training delivery mechanisms and a continued focus on training completion via the NREL Safety Council resulted in the FY03 target rate being exceeded.



NREL emphasizes reporting of all injuries regardless of how minor they appear to ensure they receive proper and timely medical management. While this "over reporting" approach can drive up the frequency rate of injuries and illnesses, NREL still continuously maintains an injury/illness frequency rate below that of the DOE and private industry R&D complex.

* *Bureau of Labor Statistics (BLS) formula –number of recordable injuries and illness per 100 workers per year. Includes all workers on NREL sites (employees, agency temporaries, subcontractors, and volunteers).*

** *BLS formula –average rate for all DOE R&D operations. Typically does not include all workers on site.*

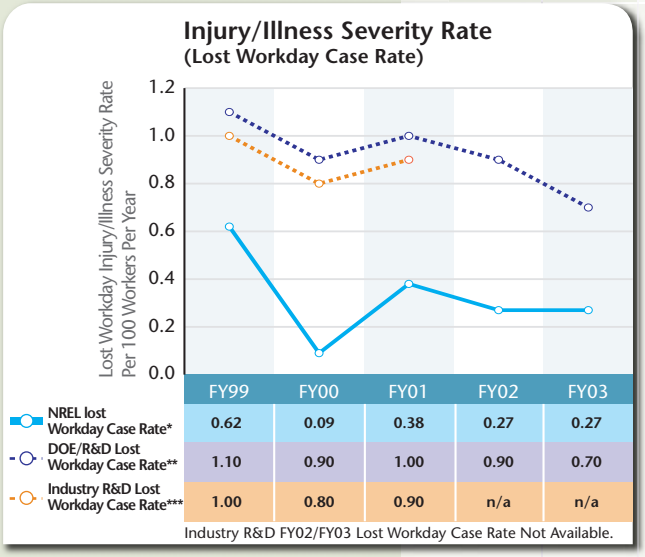
*** *BLS formula –average rate for private industry R&D operations (SIC code 8730).*

Environment, Safety, and Health

NREL's ES&H activities were also improved by implementing Web-based training courses for frequently required ES&H and Security classes, such as Ergonomics, Annual Security Refresher, and Lockout/Tagout Procedures. These Web-based courses resulted in improved completion rates and reduced time impacts on staff. (Note: A completion rate of 100% is not possible due the manner in which results enter and leave the database.)

These Web–based tools, in conjunction with a long-term program of objectives and tools coordinated by the NREL Safety Council, continue to successfully manage the severity of injuries and illnesses. The most frequent and highest risk types of injuries remain cumulative trauma disorders (CTDs, also known as ergonomic injuries), and injury prevention and management activities continue to focus in that area. This focus has successfully controlled the frequency and severity of injuries, improving the well being of NREL workers and reducing the operational and financial impacts on the Laboratory. NREL results exceed all available DOE and industry baselines.

Through NREL's concentrated efforts, several large workers' compensation case reserves were successfully closed out before they resulted in increased premium charges. Such charges, even when they are later refunded, can have a significant negative impact on the direct labor multiplier.



	FY99	FY00	FY01	FY02	FY03
NREL lost Workday Case Rate*	0.62	0.09	0.38	0.27	0.27
DOE/R&D Lost Workday Case Rate**	1.10	0.90	1.00	0.90	0.70
Industry R&D Lost Workday Case Rate***	1.00	0.80	0.90	n/a	n/a

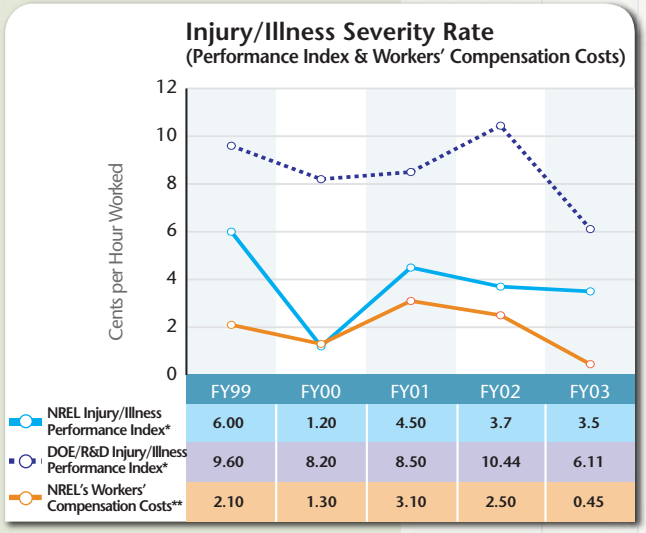
Industry R&D FY02/FY03 Lost Workday Case Rate Not Available.

The rate at which injuries result in lost workdays is an indicator of injury severity. NREL continuously maintains a lost workday case rate significantly lower than the DOE and private industry R&D complex.

* *Bureau of Labor Statistics (BLS) formula –number of injuries and illness resulting in lost workdays per 100 workers per year. Includes all workers on NREL sites.*

** *BLS formula - average rate for all DOE R&D operations. Typically does not include all workers on site*

****BLS formula - average rate for private industry R&D operations (SIC code 8730).*



	FY99	FY00	FY01	FY02	FY03
NREL Injury/Illness Performance Index*	6.00	1.20	4.50	3.7	3.5
DOE/R&D Injury/Illness Performance Index*	9.60	8.20	8.50	10.44	6.11
NREL's Workers' Compensation Costs**	2.10	1.30	3.10	2.50	0.45

Another indicator of injury severity is the cost incurred for medical services, lost time, etc. This cost can either be estimated via the DOE Performance Index (PI) formula, or directly calculated via actual workers' compensation expenses. The NREL PI is well below the DOE R&D complex average, and the actual workers' compensation costs demonstrate a continuous downward trend.

* *DOE formula –approximate rating of injury and illness severity in cents per hour worked. No direct comparison to private industry.*

** *Actual NREL workers' compensation costs in cents per hour worked. Comparison data not available for DOE and private industry. Performance of 25 cents per hour worked or lower is considered good.*

Technology Transfer

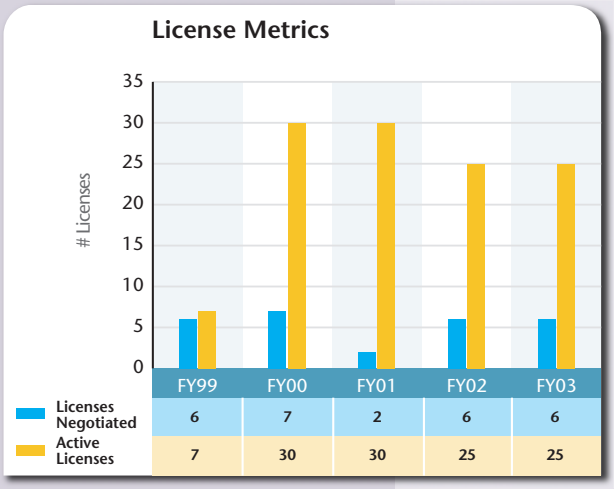
The Laboratory catalyzes mutually beneficial partnerships between industry, entrepreneurs, investors, and incubators to commercialize NREL-developed technologies.

NREL's goal is to improve the yield of R&D entering the marketplace through better integration of new technologies, strong business models, and capital resources.

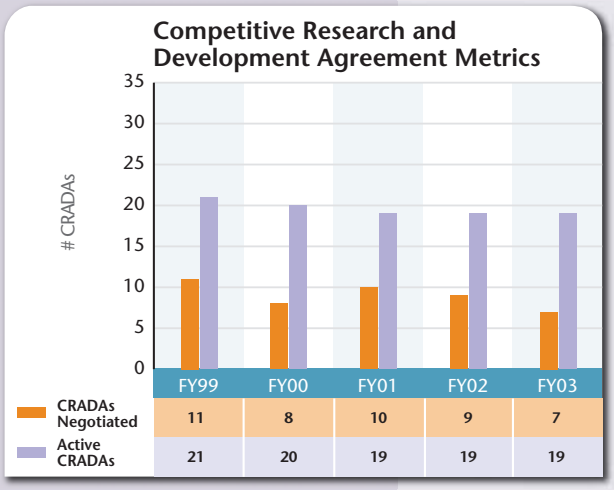
During FY03, the Laboratory negotiated six new licenses for commercialization of NREL technology, and reached binding business terms for an additional NREL technology associated with a CRADA. The aggregate value of these deals to the Laboratory exceeds $13 million in joint research funding and future royalties, and is expected to have many times that impact on the U.S. economy through the creation of jobs, reduced reliance of foreign oil, and through providing clean energy and clean energy products to consumers.

The Federal Laboratory Consortium (FLC) is a nationwide network of more than 700 federal laboratories that provides a forum to develop strategies and opportunities for linking Laboratory mission technologies and expertise with the marketplace.

NREL was honored in FY03 with two prestigious "Excellence in Technology Transfer" awards in recognition of excellence for transferring government-sponsored technologies to the public and private sectors. Additionally, the FLC Mid-Continent region recently honored NREL with an award for outstanding technology development in recognition of the Laboratory's long-term efforts for "Using Renewables to Safeguard the Energy Infrastructure of the U.S."



NREL continues its strong five-year trend of licensing its technologies. NREL uses licenses to transform its expertise and technology into commercially available products.



NREL demonstrates economic value through the development of technology partnerships that transfer NREL technology to the commercial market and leverage DOE R&D investments. In FY03, $2.4 million was brought into the Lab from NREL's CRADA collaborations.

Technology Transfer

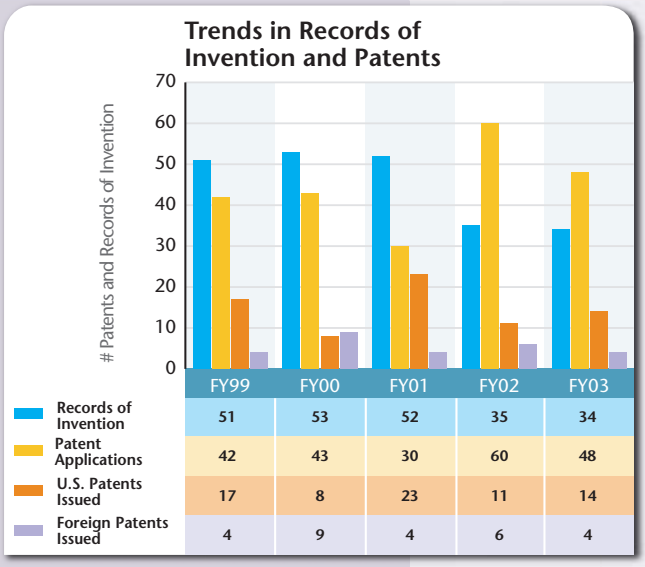
NREL provided technical expertise on more than 163 federal clean energy projects resulting in energy savings and reduced costs. Cumulative results include the annual energy savings of 1.6 million BTUs or nearly 500,000 kWh. This translates into an annual cost savings of approximately $20.7 million in taxpayer dollars.

NREL's technology expertise supported DOE's Federal Energy Management Program (FEMP) in its goal to assist agencies in obtaining 2.5% of their electricity from a renewable source by the year 2005. With NREL's assistance, FEMP realized continued success in FY03 by surpassing this goal by more than 50%, compared to 14% two years ago and 26% one year ago.

Most commercialization of emerging clean energy technology happens through entrepreneurs and entrepreneurial companies. NREL's established National Alliance of Clean Energy Business Incubators organization has grown, attracting 10 of the nation's top incubators that are committed to incubating and providing business services to clean energy entrepreneurs. This helps NREL foster faster market entry of clean energy technologies and leads to real economic growth on a national basis.

In FY03, NREL's strategic partnership with the Alliance succeeded in the following economic developments:

- 10 graduate companies
- 59 current clean energy companies in incubators
- 700 jobs associated with energy companies
- $21.3 million in capital raised
- $75.6 million in revenues
- $5.3 million in state money
- $6.1 million in other leveraged funds



NREL protects intellectual property through records of invention, patent applications, and patents to maximize the value of the technology and create opportunities for commercial development by industry.

NREL also leverages its intellectual property portfolio to attract partners, develop new business for the Laboratory, and ultimately transfer technology to the private sector, where it reduces U.S. reliance on imported energy, provides jobs, and protects the environment.

In FY03, NREL continued its strong record of accomplishment in partnering with and transferring technologies to the private sector.

For example, AVL Powertrain Engineering Inc. obtained the license to commercialize and refine NREL's ADVISOR vehicle simulation software. ADVISOR enables users to simulate a conventional, hybrid electric, or fuel cell vehicle over a city or highway drive cycle and predict the vehicle performance.

The agreement with AVL provides a highly visible commercial outlet for NREL's advanced vehicle simulator research and will lead to more relevant use of ADVISOR by automakers.

NREL is also working with DuPont in a joint research project to develop, build, test, and pilot the world's first integrated "bio-refinery."

This bio-refinery uses corn or other renewable resources, rather than traditional petrochemicals, to produce a host of valuable fuels and value-added chemicals. New technologies that produce energy from biomass will allow the United States to reduce its reliance on foreign sources of fossil fuels, while stimulating the agricultural economy by creating new markets for underutilized grains and crop residue.

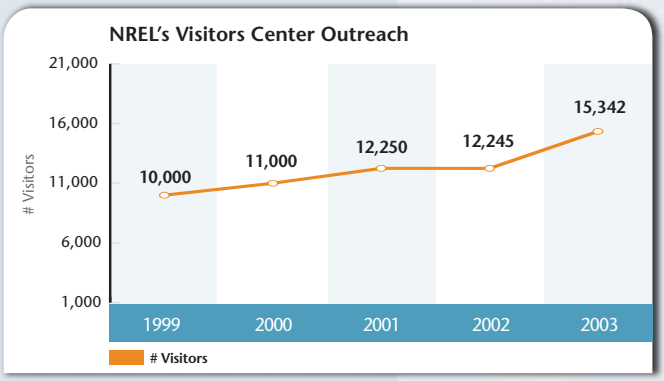
Educational Science and Engineering Outreach

Effective use of strategic partnerships, enhanced outreach, and leveraging of DOE investments in FY03 allowed NREL's educational programs to reach more teachers and students locally and nationally then ever before.

The number of interns hosted at the Laboratory increased 54% over FY02, as a result of implementing new recruitment and professional development strategies. NREL interns work side-by-side with top research scientist and engineer mentors on development of new technologies and research in renewable energy. Nationally, 11.5% of NREL's intern papers were published, marking the highest rate of intern publications of all 11 DOE laboratories. Internships further expand awareness and understanding of EERE science and technology as students and teachers return to their schools and universities throughout the nation, providing the Laboratory with a potential workforce pool – NREL's next generation of scientists and engineers.

The Laboratory continued to make significant gains in reaching under-represented student and teacher populations through enhanced programs and partnerships. The Colorado Association of Partners in Business recognized NREL's Coalition for Learning Opportunities and United Tutors (CLOUT) science literacy program and honored the Laboratory with an Exemplary Volunteerism Award in acknowledgement of the Laboratory's partnership with the Denver Public Schools and quality program delivery.

NREL also leveraged the Laboratory's nationally profiled Education Advisory Council (EAC) to increase recruitment efforts for African American, Native American, and Hispanic students through the Society for the Advancement of Chicanos and Native Americans (SACNAS) and Mathematics, Engineering, Science Achievement (MESA) USA. The NASA deputy associate administrator for Education Programs joined the Council, increasing national exposure, partnerships, and outreach possibilities.



The 20% increase in visits to NREL's Visitors Center is indicative of the Laboratory's growing reputation in the community as a resource for consumer information and educational opportunities.

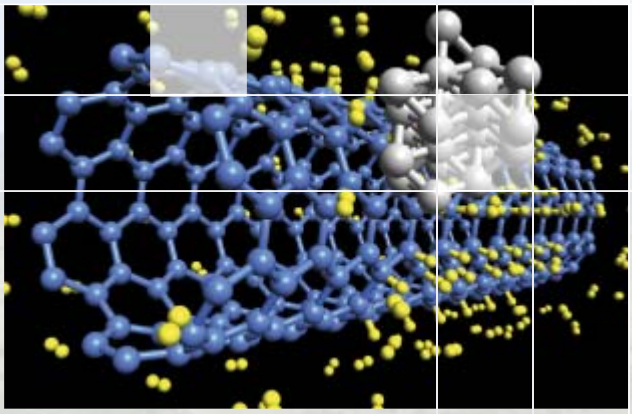
Noting NREL's exceptional program execution for the 2003 National Middle School Science Bowl, the DOE Office of Science selected NREL to host the 2004 Science Bowl, helping to raise the Laboratory's national profile in education, while reinvigorating external university and industry partnerships.

Additional partnerships with national and local organizations resulted in more than 175 teachers from across the nation participating in energy education conferences sponsored and delivered by NREL with the National Energy Education Development, Xcel Energy Foundation, and Hands on Science Institute. A significant industry alliance is NREL's partnership with BP America that resulted in the Renewable Energy and Efficiency Education on Wheels (RnE2EW) bus and trailer, designed to educate students, teachers, and the community in renewable energy and energy efficiency sciences, while showcasing DOE/NREL research and technology. The RnE2EW trailer accompanied the American Solar Challenge from Chicago to New Mexico, introducing new audiences to renewable energy and energy efficiency.

NREL's Visitors Center outreach increased awareness and understanding of renewable energy and energy efficiency technologies among the public and students. Of the 15,000 guests who visited the Center in FY03, 4,237 participated in educational programs. The Visitors Center enhanced its educational-related program offerings by developing and implementing age-appropriate programs and support materials, including: Renewable Rangers youth program, 4th-6th grade; Young Scholars, 7th grade - high school; Collegiate, 18 years and older; and Energetics!, adults. According to the annual Visitors Center survey results, these programs were on-target in content and delivery, receiving an overall "Excellent" rating by educators.

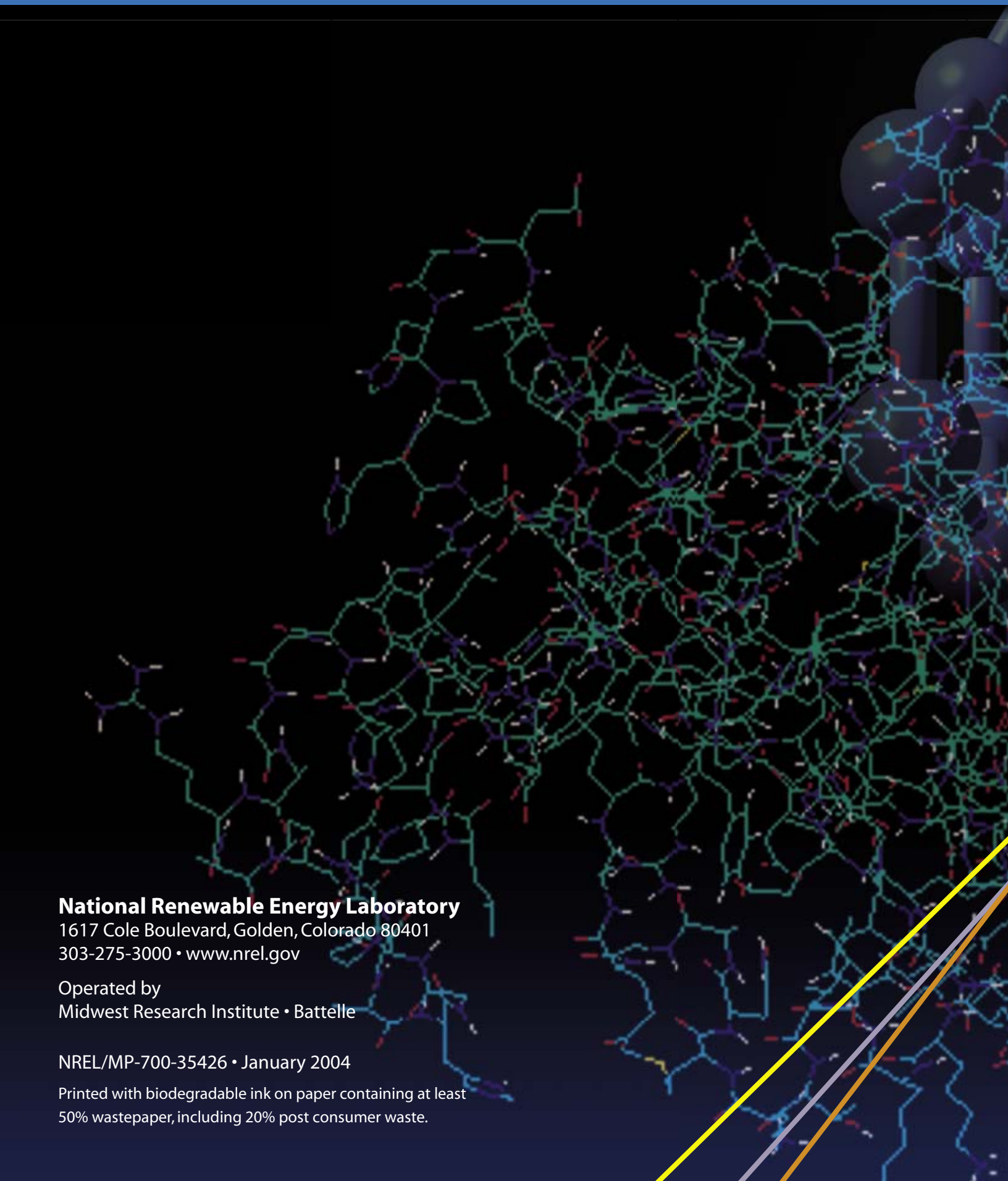
In addition to education specific programs, the Visitors Center offered a range of consumer focus programming options such as the bi-weekly Community Focus programs, workshops, and special events. These efforts provided valuable information about renewable energy and energy efficiency technologies for students of all ages.

The Visitors Center collaborated with other organizations such as the Colorado Energy Science Center to deliver numerous technical-related workshops for consumers as well as teacher training workshops.



"We realize that the way we conduct our own operations and invest in our Laboratory is important to the future."

Richard Truly
Director,
National Renewable
Energy Laboratory
January 2004



National Renewable Energy Laboratory
1617 Cole Boulevard, Golden, Colorado 80401
303-275-3000 • www.nrel.gov

Operated by
Midwest Research Institute • Battelle

NREL/MP-700-35426 • January 2004

Printed with biodegradable ink on paper containing at least 50% wastepaper, including 20% post consumer waste.